

Establishing Operational Readiness Levels for Data

*All Hazards Consortium [SISE Use Case Template Advisory Committee] /
ESIP Federation [Disaster Lifecycle Cluster]*

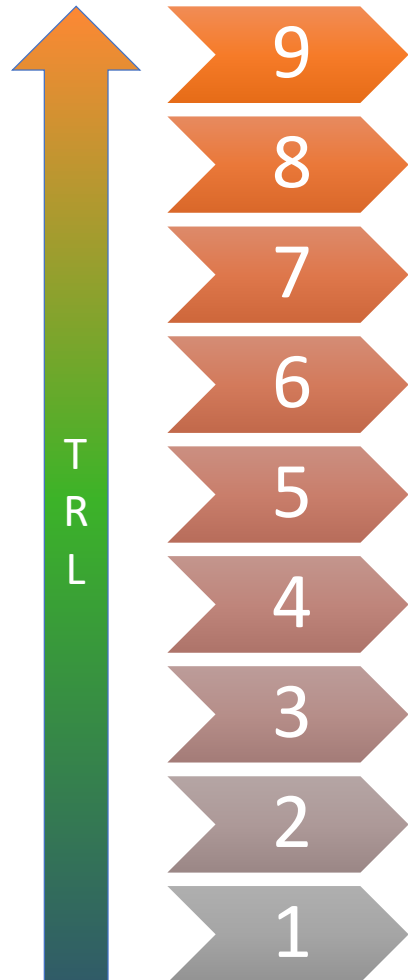
Effort Under

Data Driven Decision Making Initiative (3DM)



TRL to ORL Mapping

Technology Readiness Levels to Operational Readiness Levels



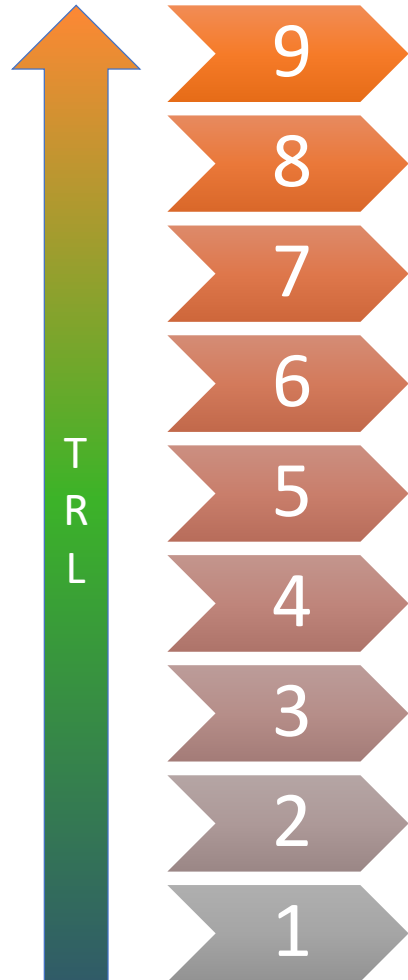
NASA Earth Science Technology Office TRL Levels

- What follows are the basic TRL definitions for NASA technology development. The full document, including additional descriptions and definitions of terminology, is [available here](#).
- **TRL 9 Actual system "mission proven" through successful mission operations (ground or space)**
- **TRL 8 Actual system completed and "mission qualified" through test and demonstration in an operational environment (ground or space)**
- **TRL 7 System prototyping demonstration in an operational environment (ground or space)**
- **TRL 6 System/subsystem model or prototyping demonstration in a relevant end-to-end environment (ground or space)**
- **TRL 5 System/subsystem/component validation in relevant environment**
- **TRL 4 Component/subsystem validation in laboratory environment**
- **TRL 3 Analytical and experimental critical function and/or characteristic proof of concept**
- **TRL 2 Technology concept and/or application formulated**
- **TRL 1 Basic principles observed and reported**
- ESTO has also built a worksheet (Microsoft Excel) that aids in performing, and justifying, a TRL assessment.
[+ Download the ESTO TRL Worksheet](#)

Revised March 10, 2017

TRL to ORL Mapping

Technology Readiness Levels to Operational Readiness Levels



Purpose of Creating ORLs

- Indicate a quick way of indicating the Operational Readiness of Specific Datasets
- Simple scale for rapid adoption by Ops analysts & decision makers
- Must communicate clear status of dataset/service
- Period of Testing and Verification via SISE/FRWG GeoCollaborate® Dashboard and RT collaboration sessions
- Contact with data curator/provider essential (need to know who collects, curates and publishes this data)
- Make sure we get the data from the TRUSTED source
- Identify Issues with the data
 - Provide those issues with ORL Level (i.e. if server is down on weekends it doesn't get fixed until Monday or 24/7 support available)
- Discovery & Feasibility
 - Exposure through Data-Driven Decision Making Workshops
 - Sub-groups tasked with testing and evaluating

Revised March 10, 2017

TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

Comments & input from group (ID yourself)



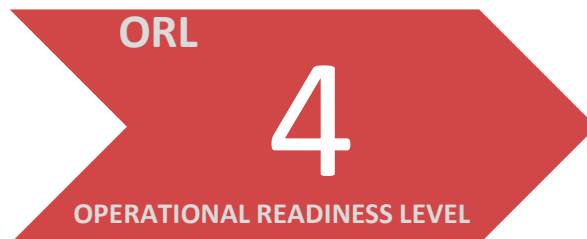
- Data available NOW
- Immediate Situational Awareness (SA) & Decision Making (DM)
- Person available to contact



- Data available sporadically
- Event-driven, may be delayed due to acquisition and processing time required
- Could be very useful for SA & DM
- Person available to contact



- Data nearly operational, testing phase
- Not guaranteed
- Could improve SA and DM
- Target operations in 6-12 months



- Data in collection, processing and/or testing phase
- Being evaluated for accuracy, validated
- Target for operations 12+ months
- Not likely to be immediately useful for operations

Dave Jones: Place your comments here, thanks.

Example Data Sets - ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

Product – Data Layer

NWS Watches, Warnings & Advisories

Updated: Every minute

Source: NWS Integrated Dissemination Program (operational)

Servers: College Park, MD

Backup: Boulder, CO

Data Availability 24/7/265

EXAMPLES

TRL to ORL Mapping

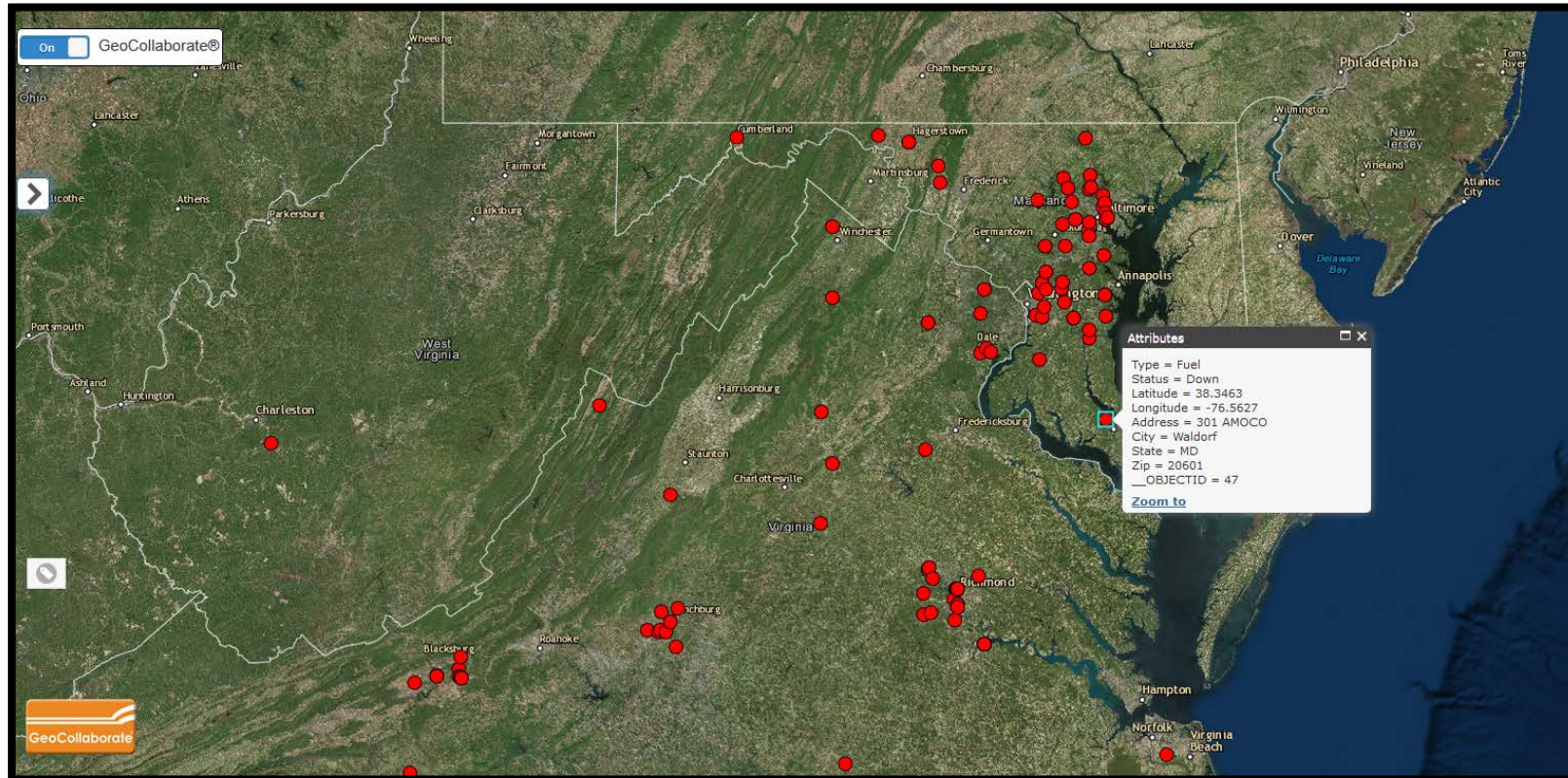
Operational Readiness Levels (Focusing on Quality & Availability)

ORL

4

OPERATIONAL READINESS LEVEL

- Data in collection, processing and/or testing phase
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Draft

Product – Data Layer

Power Outages for Fuel, Food, Pharmacies

Updated: Frequent updates from provider

Source: Hughes Corp

Servers: Hughes Corp

Backup: TBD

Data Availability: Subscription service could be developed to leverage 24/7 data availability within GeoCollaborate®. Currently data available via All Hazard Consortium.

TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

ORL

4

OPERATIONAL READINESS LEVEL

- Data in collection, processing and/or testing phase
- Being evaluated for accuracy, validated
- Target for operations 12+ months
- Not likely to be immediately useful for operations

Product – Data Layer

NASA Satellite Image Analytics of Tornado Tracks.

Updated: When imagery is available, possibly hours to days after event

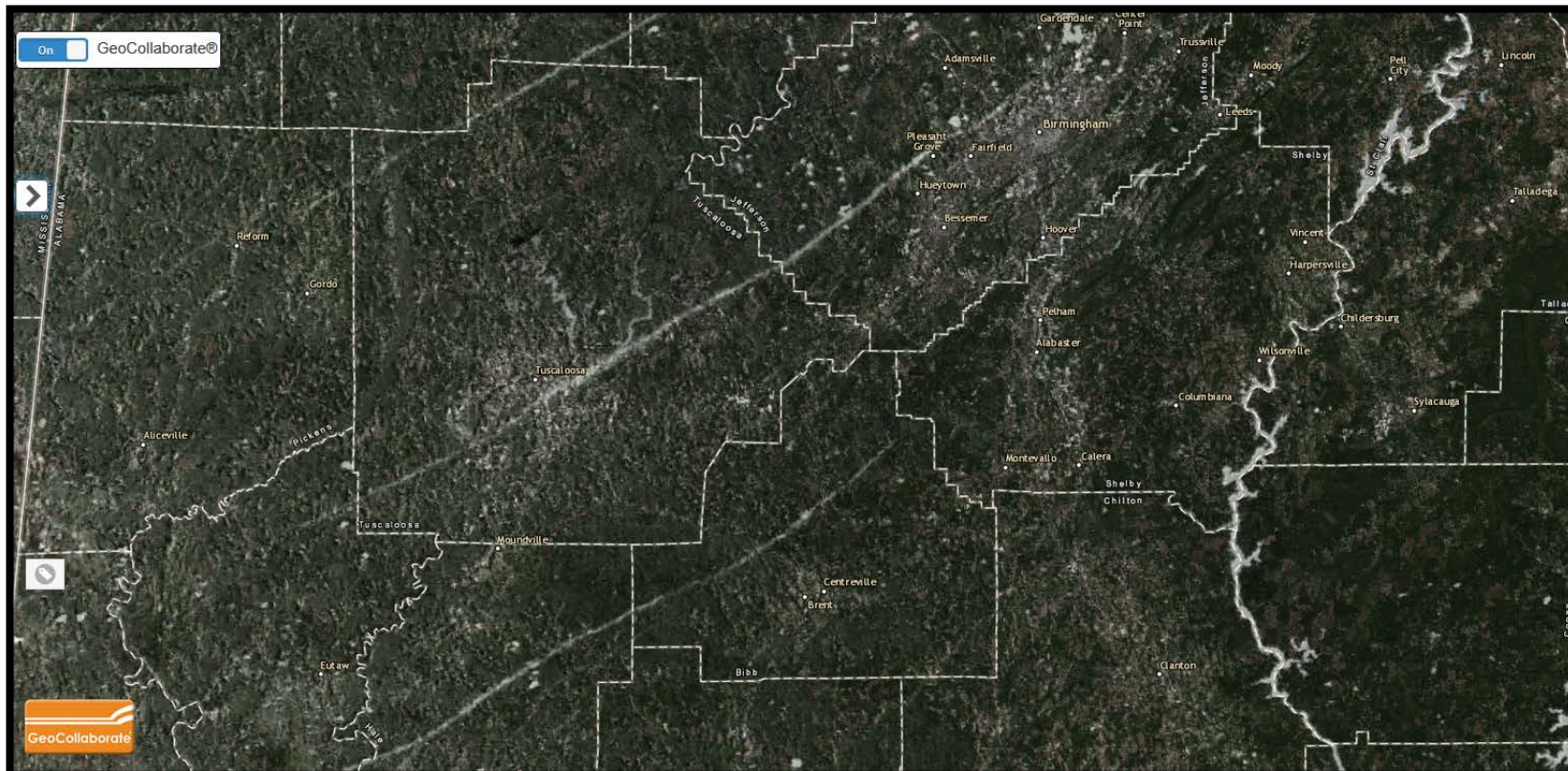
Source: NASA, NASA SPoRT (Huntsville, AL)

Servers: NASA Huntsville, GSFC

Backup: TBD

Data Availability: Sporadic depending on event and satellite data availability. Data analytics performed by NASA SPoRT, a non-operational entity to accelerate research data into operations.

Description: Major tornado tracks can help with damage assessment



TRL to ORL Mapping

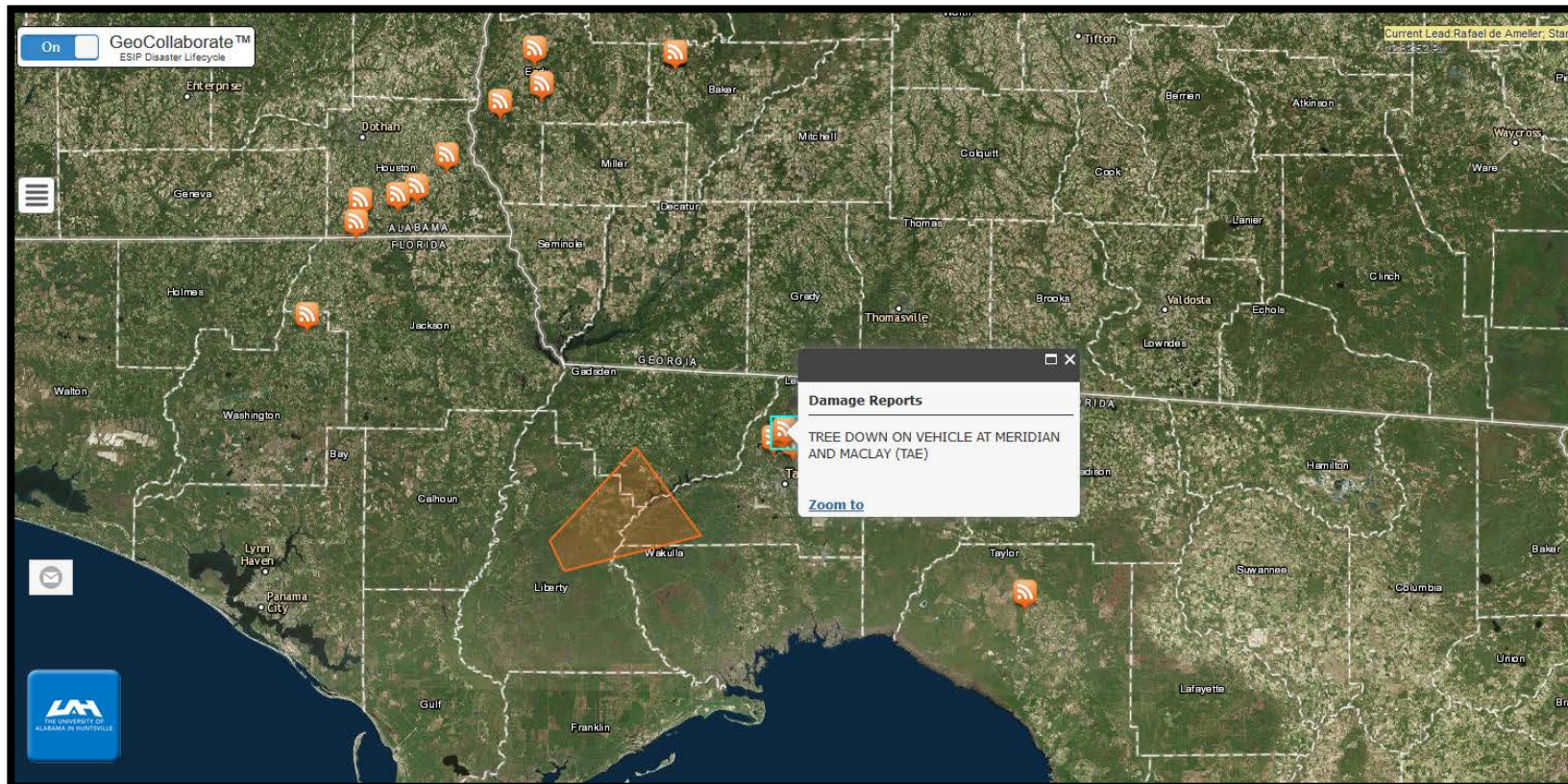
Operational Readiness Levels (Focusing on Quality & Availability)

ORL

3

OPERATIONAL READINESS LEVEL

- Data nearly operational, testing phase
- Not guaranteed
- Could improve SA and DM
- Target operations in 6-12 months



Draft

Data Description

Univ. Alabama Huntsville-Event Catalog

Updated: Periodically, Event Driven
Source: NWS, Social Media

Servers: Univ of Alabama Huntsville

*Data Availability: Event-driven
automated data delivery and
processing of disaster events*

Description: Event-driven data delivery (ED3) is being used to automate the access and processing of data for decision support as the result of disaster events. For example: Using the output of a flood modeling system to define a flood potential as an event that would trigger data access and additional processing to make more rapid decisions about possible flood conditions, which could help mitigate the effects of the eventual flood itself.

TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

Data Description



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NOAA SNPP VIIRS Day/Night Imagery

Updated: Daily

Source: NOAA NESDIS (U of Wisconsin)

Servers: Univ of Wisconsin

Data Availability: Imagery acquired daily during polar orbiting satellite pass. Day/night imagery can indicate power outages.

Description: Power Outage Image

Red highlighted areas are where power is out after a storm impacted the area.

TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

Data Description

ORL

2

OPERATIONAL READINESS LEVEL

- Data available sporadically
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Digital Globe High Resolution Satellite Imagery

Updated: Gallery or Tasked Satellite
Source: Digital Globe satellite constellation

Servers: Digital Globe

Data Availability Subscription Service or Imagery available via treaty during disasters to agencies/partners

Description: Private sector satellite operators can acquire imagery anywhere in the world, for a price. Federal Government gets imagery when a disaster hits across the globe under a treaty to help with response and assessment.

TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

Data Description



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NOAA Wildfire / Smoke Detection

Updated: Daily

Source: NOAA NESDIS/Univ of Wisc

Servers: Univ of Wisc

Data Availability: Daily algorithms run on imagery to pull out hot spots and smoke plumes

Description: NOAA satellite-SNPP has a sensor on it that can detect hot spots which most of the time correlate to wildfires. This can be very helpful in locations where visible detection is not possible. Also helps assess the size of a wildfire and the threats to urban locations.

TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

Draft

Data Description

ORL

1

OPERATIONAL READINESS LEVEL

- Data available NOW
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Department of Energy Processed Petroleum Pipelines

Updated: Annually

Source: DOE

Servers: DOE

Backup: TBD

Data Availability 24/7/265

Description: This dataset is a static dataset offered via DOE GIS services. If DOE updates this database then the layer will update.



TRL to ORL Mapping

Operational Readiness Levels (Focusing on Quality & Availability)

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Data Description



- Data available NOW
- Immediate Situational Awareness (SA) & Decision Making (DM)
- Person available to contact

NWS Watches, Warnings & Advisories

Updated: Every minute

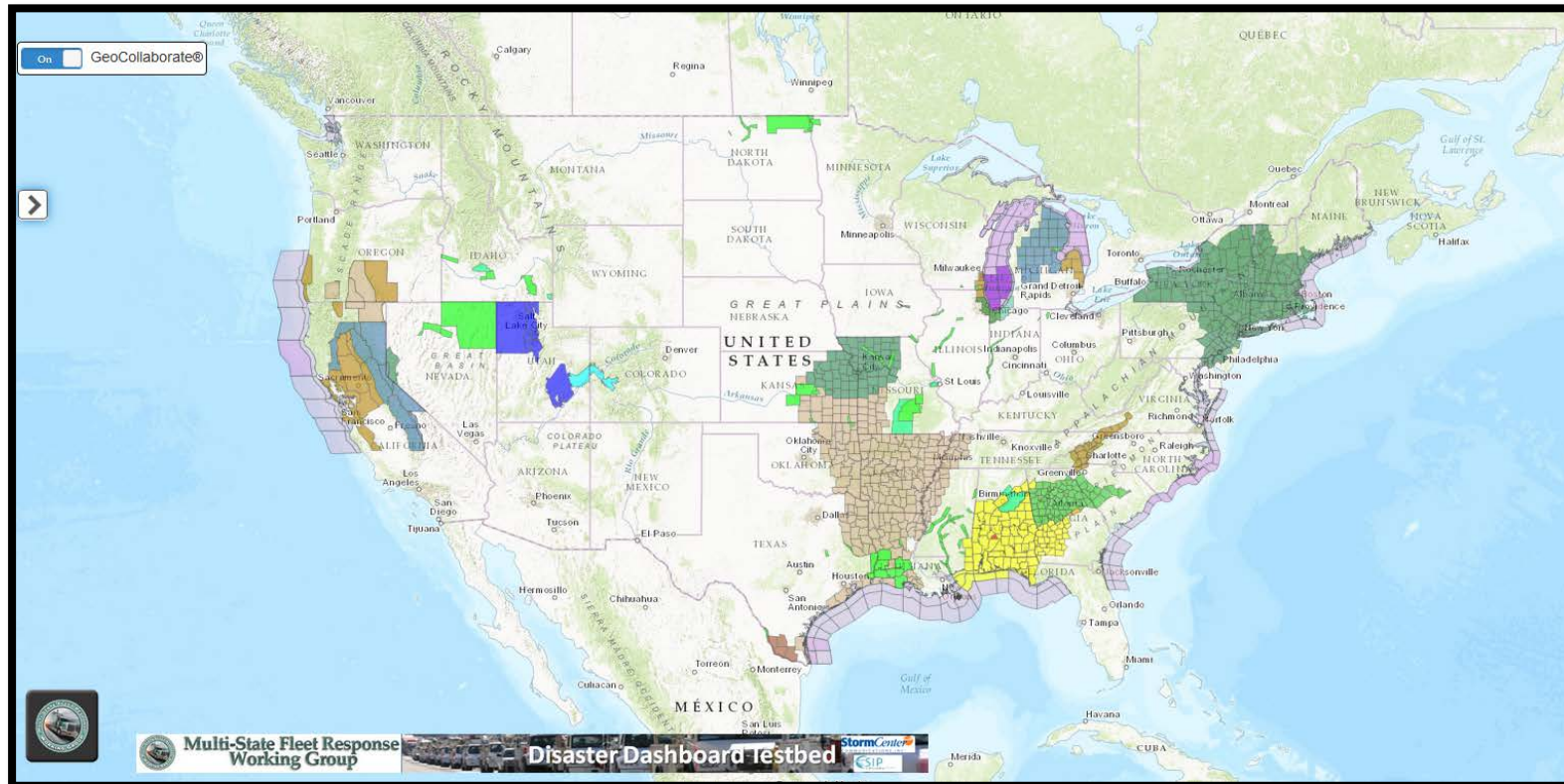
Source: NWS Integrated Dissemination Program (operational)

Servers: College Park, MD

Backup: Boulder, CO

Data Availability 24/7/265

Description: Latest NWS issued watches and warnings, including flood warnings, river flood warnings, hurricane warnings, watches and many others.



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Data Description

ORL

1

OPERATIONAL READINESS LEVEL

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NWS National Weather Radar

Updated: Every 6-11 minutes

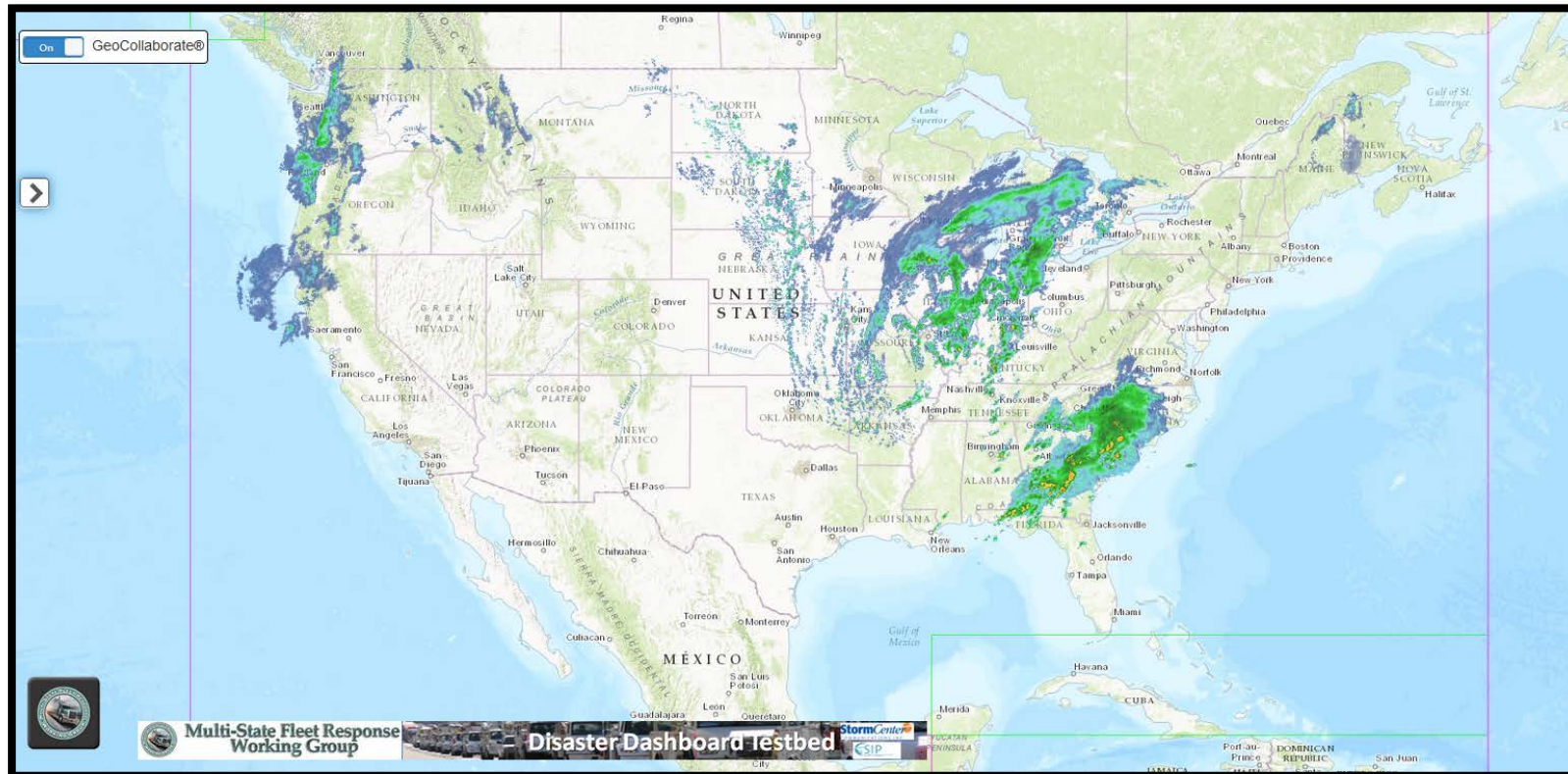
Source: NWS Integrated Dissemination Program (operational)

Servers: College Park, MD

Backup: Boulder, CO

Data Availability 24/7/265

Description: Latest status of rain, snow and severe weather direct from 122+ NWS forecast offices. This product combines the radars together for a single national and regional view of current precipitation



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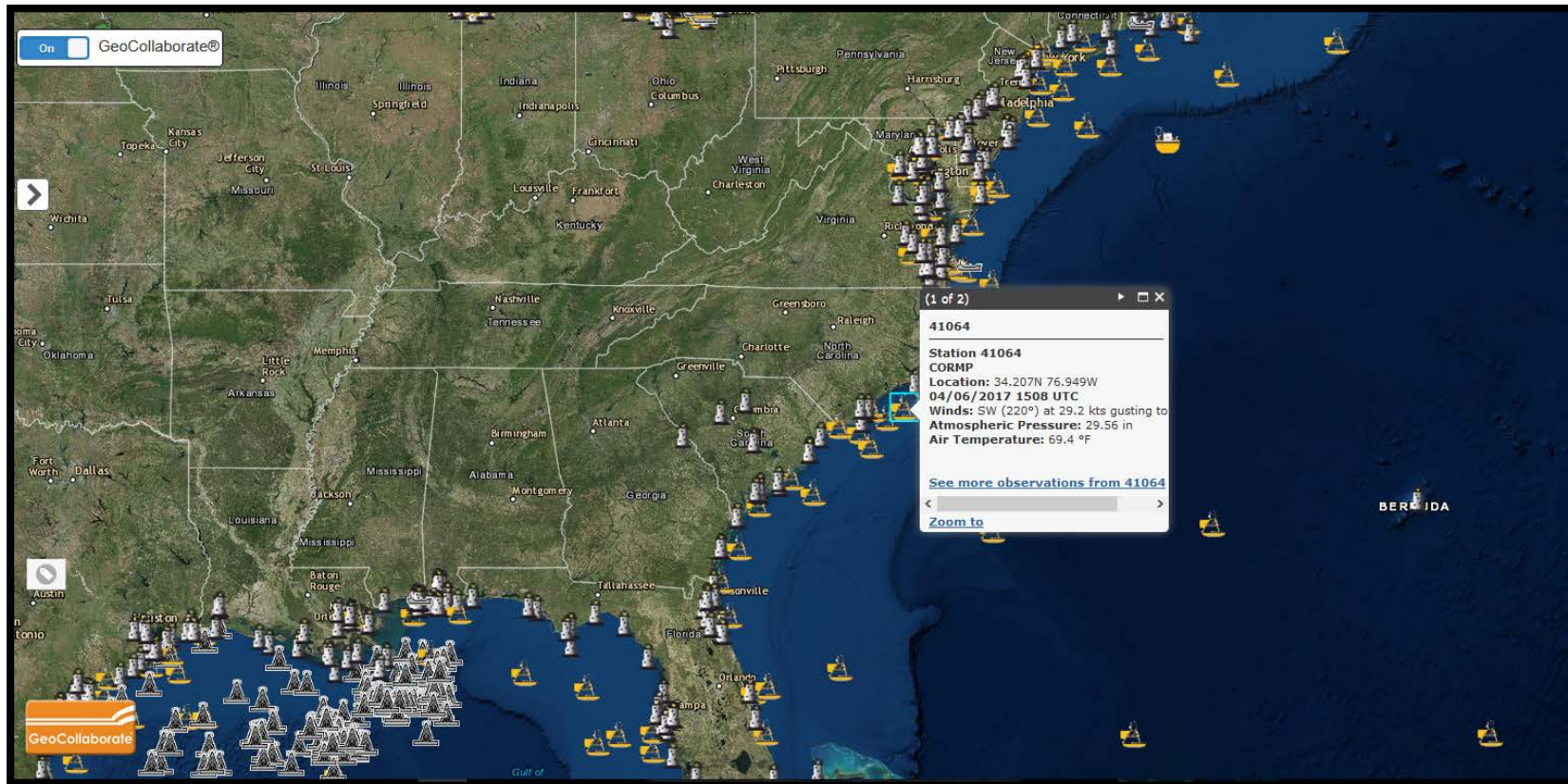
Data Description

ORL

1

OPERATIONAL READINESS LEVEL

- Data available NOW
- Immediate Situational Awareness (SA) & Decision Making (DM)
- Person available to contact



NOAA NDBC – National Data Buoy Center

Updated: Every 30-60 minutes
Source: NOAA Marine Observations

Servers: NOAA
Backup:

Data Availability 24/7/265

Description: LIVE data from NOAA and other buoys that help with storms at sea and weather observations, wave heights, etc.